Ousting Pink Bollworm From Cotton Fields

PEGGY GREB (K10075-6)

Pink bollworms emerging from a damaged cotton boll.

Pink bollworm is the most important cotton pest in the world," entomologist Thomas J. Henneberry declares. "It's found in almost every cotton-producing country and has caused millions of dollars of damage and lost acreage in the last 35 years in the United States."

Henneberry is the research leader for ARS' Western Cotton Research Laboratory in Phoenix, Arizona. Some of the findings from years of pink bollworm research at this lab are being used by the National Cotton Council (NCC) Pink Bollworm Action Committee in a cooperative program to eradicate the pest.

In its adult, or moth, stage, the pink bollworm lays its eggs on cotton bolls. The eggs hatch into larvae that eat the cottonseeds and damage and discolor the fiber. According to the NCC—a trade organization representing the U.S. cotton industry—total costs to cotton producers are more than $21 million annually in prevention, controls, and lost yields.

There have been many attempts to get rid of this pest, but those involved with the program think they may finally succeed. ARS conducted the initial pink bollworm research in Hawaii back in 1915, since most believed the insect would enter the U.S. mainland eventually. Two years later, it entered Texas in infested cottonseed. By 1965, it had spread throughout southern California and the southwestern United States.

ARS has studied four general eradication approaches over the years. A combination of these technologies will be used in the program, which will rely on close partnerships with cotton producers. The first is to create a host-free period by shortening the growing season. This would make it harder for the pest to survive to the following season.

A second facet of this program is transgenic pest-resistant cotton. ARS researchers are working with industry to develop cotton that would not be destroyed by pink bollworms and other lepidopteran insect pests.

The third technique is to disrupt mating. Female pink bollworms release a scent so that the males can find them to mate. ARS and other researchers have developed methods of using a powerful version of this scent that, when released in cotton fields, confuses the males and makes finding the females nearly impossible.

The final part of the program will be release of sterile pink bollworm moths into cotton fields. But this only works when the population of pink bollworms is already low, says Nate Dechoretz, chief of integrated pest control for the California Department of Food and Agriculture (CDFA). Key ARS rearing research, with modifications by USDA's Animal and Plant Health Inspection Service, has allowed for large-scale moth production. Dechoretz's CDFA branch is capable of growing up to 30 million moths a day for the sterile-release program.

Essential to the program's success will be pink bollworm population monitoring, transgenic cotton resistance management, and data analysis and interpretation, Henneberry says.

The eradication program is already under way and is proposed for three phases in different locations in the southwestern United States and northern Mexico. It will be completed in 2004 or 2005.—By **David Elstein,** ARS.

This research is part of Crop Protection and Quarantine, an ARS National Program (#304) described on the World Wide Web at http://www.nps.ars.usda.gov.

Thomas J. Henneberry is with the USDA-ARS Western Cotton Research Laboratory, 4135 E. Broadway Rd., Phoenix, AZ 85040-8803; phone (602) 437-0121, fax (602) 437-1274, e-mail thenneberry@wcrl.ars.usda.gov. ◆

Pink Bollworm Bibliography

The longstanding nature of the pink bollworm problem worldwide and the likely development of areawide management programs in the future prompted three ARS scientists to produce a comprehensive unannotated bibliography of world literature on the pink bollworm. Single copies are available, while supplies last, from Steven E. Naranjo, USDA-ARS-PWA, 4135 East Broadway Rd., Phoenix, AZ 85040-8803. The bibliography is available as an Adobe Acrobat pdf at http://www.ars.usda.gov/is/np/pinkbollworm/pinkbollwormintro.htm and is searchable online at http://www.wcrl.ars.usda.gov/biblios/pbw/pbwbiblios.html where the authors will also post yearly addenda.